Everglades Restoration: Incremental Justification of a Comprehensive Plan

- Policy Issues
- Technical Procedures
- Lessons Learned

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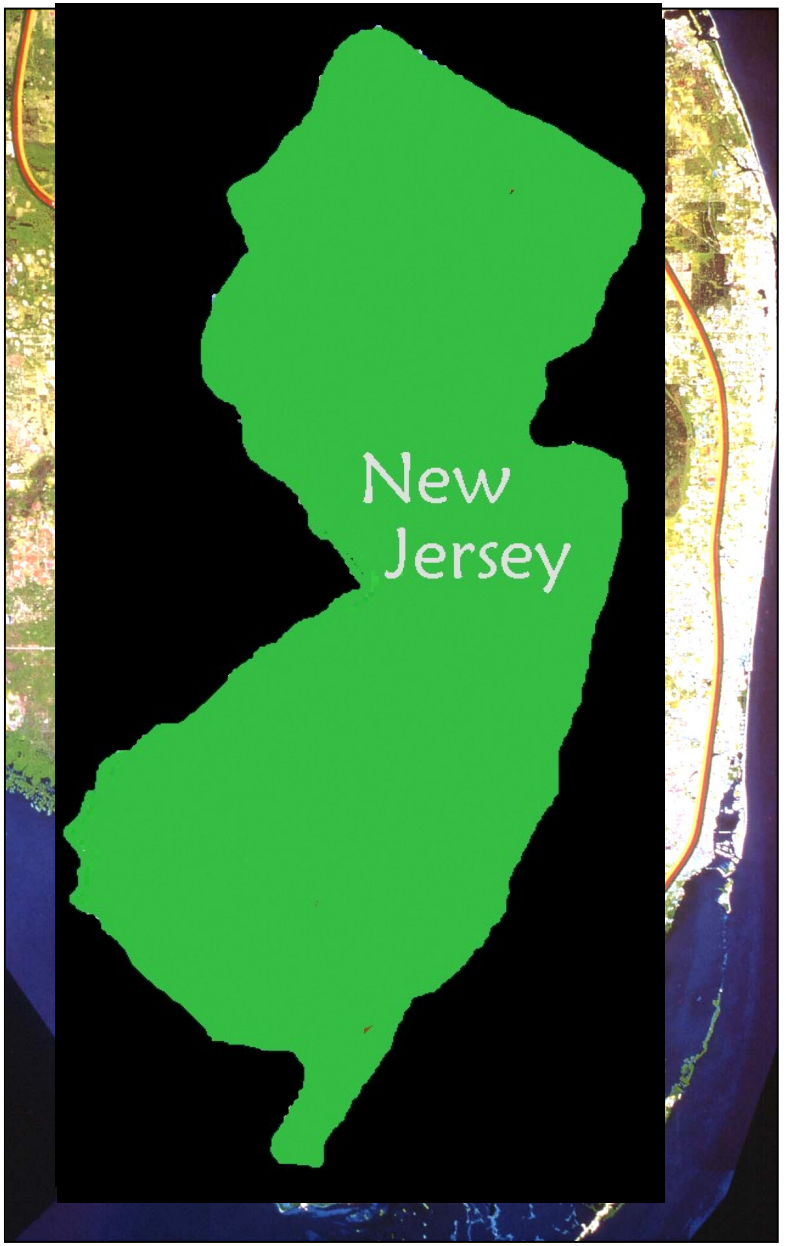
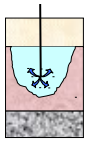
An Ecosystem in Trouble…

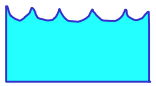
- Too much/too little water for the Everglades/south Florida ecosystem
- Declines in native habitat functions and wildlife populations
- Declining estuary health
- Degradation of water quality
- Repetitive water shortages and salt water intrusion
- 1.7 billion gallons of water a day discharged to tide



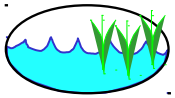
CERP Components



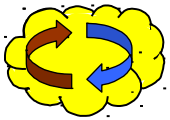
Aquifer Storage & Recovery



Surface Water Storage Reservoir



Stormwater Treatment Areas (STAs)

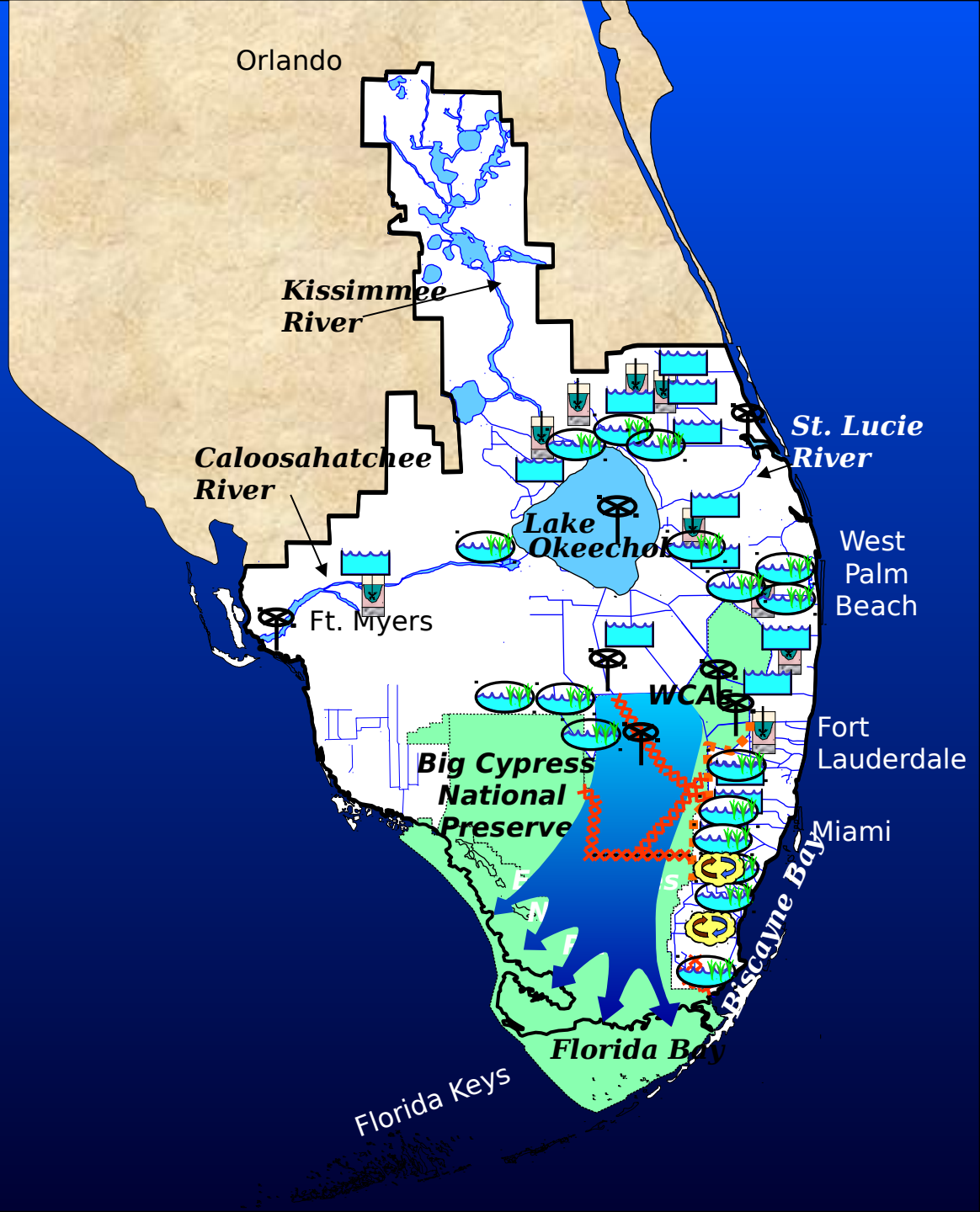


Reuse Wastewater

Seepage Management

Removing Barriers to Sheetflow

Operational Changes



Comprehensive Everglades Restoration Plan

- 1999 Feasibility Report/Programmatic EIS
  - Conceptual level of detail
- Comprehensive plan approved by Congress as a “framework” via WRDA 2000
- 1999 cost estimate: $ 7.8 B
  - Current cost estimate ~ $ 10.5 B
- 68 Components, combined into 56 projects
- Individual “Project Implementation Reports” required by WRDA 2000 for project approval and authorization
- Individual projects must be justified as the “Next-Added Increment”
  - Benefits justify costs

Additional Legal Requirements

- WRDA 2000
- State Law
  - Requirements for Non-Federal Sponsor participation
- Programmatic Regulations (2003)
  - Required by WRDA 2000
  - Detailed interpretations of legislative intent
- Programmatic Guidance Memoranda (draft, 2005)
  - Specific planning policy and technical requirements
  - GM 1: “Project Implementation Reports”
  - GM 2: “Formulation and Evaluation of Alternative Plans for Project Implementation Reports”

Definitions
"Justified"

- Defined in Pro Regs as: *"an activity is justified by the environmental benefits derived by the South Florida ecosystem"*
  - Explains why a project is justified, but not how or how much
- If the activity is cost-effective, no further economic justification is required
  - Cost effectiveness analysis based on environmental benefits
    - Habitat units

Definitions
“Next-Added Increment”

- Defined in Pro Regs as: *“the next project to be added to a system of projects”*
- Described in GMs:
  - Baseline year is 2050, including:
    - Increased population and water supply demands
    - Important non-CERP projects
      - Beneficially affects conditions in Everglades
- Purpose: To determine if the project produces sufficient benefits to justify costs, assuming no other CERP projects were built

Plan Evaluation and Selection

- Plan selection based on “System Formulation”
  - Evaluate final array of alternative plans
  - Intent: maximize the system-wide benefits of the comprehensive plan
- Compare “the future with-project condition including all of the other projects of the Plan” to the future-without-CERP baseline
  - Environmental benefits evaluation
- Describe and quantify differences in system-wide environmental benefits generated
  - Alternative plans compared to future without-project condition
  - Average annual system-formulation outputs/cost
  - Most cost-effective plan

Next-Added Incremental Justification When and What?

- Performed after plan selection
- Evaluation of system-wide environmental benefits
  - Same benefits methodology as plan selection evaluation
  - Based on different hydrologic modeling data
- Describe and quantify next-added increment benefits
  - Selected plan compared to future without-project condition
    - Different baseline than system-formulation
    - Includes other CERP approved and likely-to-be-implemented CERP projects
  - Average annual NAI outputs/cost

Next-Added Incremental Justification How?

- Compare quantity of NAI benefits to system formulation benefits
- Demonstrate dependency of other CERP projects on the project being evaluated
  - “Foundation project”
  - Relationship to legal constraints
- Consistency with project purpose
  - How much does it do what it’s supposed to do?
- Effects of adaptive management principles
  - Monitor, then operate smartly

If not justified, what next?

- Consider combining the project with other CERP components or projects to identify a plan that can be justified; or
- Consider delaying implementation until other projects come on line that can improve the justification analysis

Justification Problems

- Components of comprehensive plan not incrementally evaluated
  - Base set of management measures optimized
- Modeling tool
  - Regional hydrologic model; not an ecological model
- Environmental benefits evaluation methodology
  - Inconsistent; no basis for comparison between projects
  - No programmatic tracking of environmental benefits
- No established threshold of acceptability
  - How much = justified?
- Policy interpretations/guidance keeps changing
- Comparing NAI benefits to system formulation benefits
  - Problematic; different baselines
  - Model results complicated by synergies
  - Too narrowly constrains focus of the justification analysis

Environmental Benefits Uncertainty Issues

- Hydrologic modeling
  - Performed on a regional scale with a coarse grid size (averaging conditions within 4 sq. mile grid cells)
  - Correctly modeling assumptions and operational rules
- Performance measures
  - Hydrologic outputs; not sophisticated enough to fully characterize ecological response
  - No acceptable performance measures for key indicators
- Ecological significance of hydrologic change
  - How meaningful is an average stage change of 0.05 ft.?
- Understanding the spatial extent of ecological effects in a large system
  - Overlapping benefit areas
  - Underestimating spatial extent of effects
- Ecological response time
  - Long time-scales for key ecosystem attributes
    - Average annual outputs

Adaptive Management

- Key to attainment of restoration objectives
- Build/operate projects that we know are necessary for restoration
- Monitor and assess ecosystem response
- Adapt: make operational and/or structural changes
- Is it enough for policy and decision-makers and investors?
- $100,000,000 Adaptive Assessment and Monitoring Program authorized in WRDA 2000

Lessons Learned

- Comprehensive Ecosystem Restoration Planning?
  - Basic incremental justification required on important components
  - Evaluation tool to enable this (see EC 1105-2-407)
- NER Benefits methodology standardized
  - Economic concept
    - Compare, select and justify plans
    - Cost per unit of output will be calculated and compared
  - Public and scientific acceptability
  - Policy buy-off
- Don’t leave benefits on the table!
  - Scientific certainty vs. economic justification

Thank You!